

Exhibit BIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 09/991,287 Confirmation No. 3691
Applicant : Richard W. Strobel
Filed : November 14, 2001
TC/A.U. : 1775
Examiner : John J. Zimmerman

Docket No. : 01-651
Customer No. : 34704

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

SUPPLEMENTAL DECLARATION

I, RICHARD W. STROBEL, hereby declare:

(1) That I am the sole inventor of the invention set forth in U.S. Patent Application Serial No. 09/991,287, filed November 14, 2001, and am familiar with the contents of said application;

(2) That I have reviewed the office action mailed November 14, 2003 and the prior art references relied upon by the Examiner;

(3) That I did cause the following test to be conducted:

(a) I created a bath of molten tin alloy consisting of 1 wt% silver, 0.03 wt% phosphorous and balance tin;

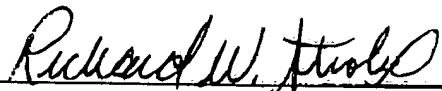
(b) I hand dipped samples of copper alloy substrates formed from copper alloys C194, C4085, and CS11 in the bath

to form a coating of said tin alloy on each of said copper substrates; and

(c) I had the hardness of the coatings thus formed analyzed at the Massachusetts Institute of Technology using nanoindentation to determine the indentation hardness of the coating on the samples. During the analysis, a 1 cm x 1 cm square was cut from the center of each sample. Each sample was mounted onto an epoxy post with cyanoacrylate (superglue). Samples were indented shortly thereafter in a humidity controlled environment (less than 55% humidity). The hardness was analyzed using a Hysitron Inc. TriboIndenter control system and a Berkovich diamond indenter. Each indentation was imposed in load control at a loading rate of $38\mu\text{N/s}$ to a final load of $750\mu\text{N}$, resulting in a maximum depth of approximately 300 nm. Testing of each sample included indentation over a 3 x 4 grid with 10 micron inter-indentation spacing at each of two distinct positions near the center of the sample, resulting in 24 indentations per sample. Indentation hardness was then calculated in units of pressure, and represents the average pressure which the sample can sustain beneath the indenter. The indentation hardness for the coating sample formed on the C194 substrate was 0.28 GPa; for the coating sample formed on the C4085 substrate

was 0.282 GPa; and for the coating sample formed on the C511 substrate was 0.293. These indentation hardness are less than the hardnesses measured by MIT using an indentation hardness technique for a 98 wt% tin- 2 wt% silver coating, for a 95 wt% tin - 5 wt% silver coating, for a 90 wt% tin - 10% silver coating, which hardnesses are reported in my pending patent application and which hardnesses are unexpected and advantageous.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity if the application or any patent issuing thereon.


Richard W. Strobel

Date: 3-11-04